Osprey

Pandion haliaetus

DESCRIPTION

The osprey is a large raptor also known as the fish hawk. Ospreys are often seen hovering over open water, plunging into water after fish, or calling from relatively exposed perches. Adult ospreys are dark brown over their backs, shoulders, coverts, and outer primaries. Underneath, they are mostly white with variable amounts of brown appearing in upper chest and neck feathers. Females often show darker streaking on the neck that often forms a distinct necklace. The head is mostly white with a broad brown stripe extending from the lores, through the eye, and down the side of the neck. In flight, dark carpal patches are evident and wings typically are held bent at the wrist. The underside of the primary feathers and retrices show white barring. Juvenile birds appear generally speckled due to buff outer edges on back, shoulder, and covert feathers.

BODY SIZE

Average osprey body size ranges from 53 – 61 cm in length, with a wingspan of 1,400 – 1,800 cm. Females tend to have a greater average mass (1.6 kg) than males (1.4 kg) and have slightly larger body sizes (Rattner *et al.* 2001).

DISTRIBUTION

Ospreys are cosmopolitan and can be found on every continent with the exception of Antarctica. The North American population breeds from Alaska across Canada and along the Atlantic coast from Newfoundland to Florida. Populations also occur clustered around the Great Lake states, northern Rocky Mountain states, and on the west coast from Washington south through Northern California. Eight thousand active nests have been found in the United States, and about 50% of the North American population is estimated to be located along the Atlantic Coast or the Gulf of Mexico (Poole 1989, as cited in Rattner et al 2001).

Figure 1. Range of the osprey in North America

Although winter occurrences of osprey have been recorded throughout the United States, the densest wintering populations in the States occur in Florida and along the gulf coast of Texas. The winter range of the osprey can extend through Mexico, Central America, and south to Argentina (Veit and Petersen 1993).

MIGRATION

Spring osprey migration in Massachusetts occurs mainly in April. Fall migration begins in August and peaks during October (Veit and Petersen 1993). Early arriving birds have been recorded during the first week of March (Forbush 1927). Males are thought to arrive earlier than females, most likely to reclaim territories and begin nest maintenance (Bent 1961). During fall migration, adult birds tend to leave the nesting territory and head southward before juvenile birds (Bent 1961). Juvenile osprey will remain in their wintering grounds during their second year, disperse further north during their third year, and typically will not return to natal areas until their fourth year (Newton 1979). Osprey migration patterns and timing are linked directly to the availability of prey (Newton 1979).

HABITAT

Although osprey can be found in both salt and freshwater habitats, they occur primarily in marine ecosystems (Rattner *et al*. 2001). Ospreys that breed in freshwater ecosystems depend on lakes, rivers, and increasingly on reservoirs. Ospreys prefer to hunt in shallow water areas of rivers, bays, or lakes where fish occur near the water surface (DeGraaf and Yamasaki 2001).

Nest site fidelity is strong. Single nests have been used for 45 years (Newton 1979). The nests consist of large masses of interwoven sticks located in sturdy trees, often large conifers with broken tops, or artificial structures including nesting platforms, utility poles, and bridge supports. As a result of prolonged use and annual repairs, nests can get as large as 6 feet high and 5 feet wide. In habitat lacking large trees, or tall structures, osprey will construct nests on bare ledge (Canadian Wildlife Service 2000).

In The Primary Study Area: Table 1 contains a summary of the literature review and observational data on the use by ospreys of the natural community types found within the primary study area.

Table 1. Habitat use by ospreys in the primary study area

Habitat Codes and Natural Community Classifications																			
Wetland Habitats												Terrestrial Habitats							
ROW	ROW & PAB	SHO		PFO				PSS	PEM		WM	VP	SW	MW	HW			OF	AGR	RES
Medium-gradient stream	Low-gradient stream	Riverine pointbar and beach	Mud flat	Red maple swamp	Black ash-red maple-tamarack calcareous seepage swamp	Transitional floodplain forest	High-terrace floodplain forest	Shrub swamp	Deep emergent marsh	Shallow emergent marsh	Wet meadow	Woodland vernal pool	Spruce-fir-northern hardwood forest	Northern hardwoods-hemlock-white pine forest	Successional northern hardwood forest	Red oak-sugar maple transitional forest	Rich mesic forest	Cultural grassland	Agricultural cropland	Residential development
B	B	B	B																	

ROW = Riverine Open Water
SHO = Shorelines
PFO = Palustrine Forested
PSS = Palustrine Scrub-Shrub
PEM = Palustrine Emergent
WM = Wet Meadow
PAB = Palustrine Aquatic Bed
VP = Vernal Pool
SW = Softwood Forests
MW = Mixed Forests
HW = Hardwood Forests
OF = Open Fields
AGR = Agricultural Croplands
RES = Residential

Season of Use
B = Breeding
M = Migration
W = Wintering
Y = Year-round
Shading = observed in study area

HOME RANGE AND TERRITORIALITY

Nest site availability and prey abundance are the most important determining factors for osprey home range size and territorial behavior (Newton 1979). The nest site is the focus of the home range and is typically the location of display, pair bonding, courtship feeding, and copulation (Newton 1979). Ospreys will occasionally nest in loose colonies with nests placed as close as 160 ft apart. Colonies occur mostly on islands or in close proximity to salt marshes (Bent 1961, Newton 1979). Ospreys will also use communal feeding areas in coastal bays and estuaries (Newton 1979). In situations with lower prey abundance, ospreys are solitary nesters, with nest sites spaced 6 or more miles apart (Rattner *et al.* 2001).

BREEDING

Ospreys are generally late-season breeders relative to other raptors of their size. This is likely due to an adaptive delay to allow ice to break up and to allow fish to move into shallow waters (Newton 1979). Breeding pairs in New England arrive at a nest site in early to mid-April and begin nest repairs and courtship. During the courtship period the male continually offers food to the female. This behavior continues throughout the breeding cycle, and is critical for pair bond formation and female fidelity (Poole 1985). Egg laying typically begins by early May (Veit and Petersen 1993). The clutch generally consists of 2 – 3 eggs and incubation lasts 37 – 38 days (Newton 1979). The male feeds the female throughout the incubation and brooding period. Male birds will also relieve the female for short durations (Newton 1979). Nestlings are fed in the nest for 4 – 60 days, and then remain in the area for an additional 3 – 4 weeks after fledging (Newton 1979). On average, nesting success of ospreys ranges from 0.7 – 1.4 young per nesting cycle.

GROWTH AND DEVELOPMENT

Like all diurnal birds of prey, osprey hatchlings emerge as "semi-precocial" young. This means that down covers their bodies and their eyes open hours after hatching, and they actively take food with their bills. By 10 – 20 days after hatching, a thick buff-colored plumage replaces hatchling down. Ten-day-old chicks are already mobile and quickly approach the female for food. The first feathers to appear are the rusty-golden pinfeathers on the head and neck. Darker body feathers develop slightly later, and primaries, secondaries, and outer feathers of the wings and tail emerge at 20 – 25 days. At 30 days old, they have reached 70 – 80% of their total body weight (Poole 1989, as cited in USEPA 1993).

The highest quantities of food are brought to the nest once the nestlings are 40 days old. At this period, the males are bringing up to 6 fish to the nest per day. During the early stages of brooding 2 – 3 fish are brought to the nest per day (Newton 1979). At the time of fledging, parents will make food transfer to the young increasingly difficult and attempt to lure the young progressively further from the nest site (Newton 1979).

MOLTING

Juvenile plumage is fully developed by 60 days of age (Henny 1988, as cited in USEPA 1993). By 18 months of age, juvenile birds have developed plumage similar to adult plumage, but do not develop full adult plumage until the end of their second year (Newton 1979). Basic molt in adult birds occurs in two phases; the first phase occurs while birds are on the wintering ground, and the second phase takes place in the summer prior to fall migration (Henny 1988 as cited in USEPA 1993).

FOOD HABITS AND DIET

Ospreys are primarily piscivorous, but will consume reptiles, small mammals, crustaceans and birds on occasion. This species forages by hovering over water and diving feet first for prey. The osprey feeds almost exclusively on medium-sized (i.e., 11 – 30 cm) live fish that remain in shallow waters or near the water's surface. The osprey is known to feed specifically on menhaden (*Brevoortia* sp.), channel catfish (*Ictalurus punctatus*), white perch (*Morone Americana*), shad (*Alosa* sp.), sunfish (Centrarchidae), largemouth bass (*Micropterus salmoides*), winter flounder (*Pseudopleuronectes americanus*), herrings (Clupeidae), and silversides (*Medidia* sp.), and will travel up to 6 – 10 miles to find food (Clark 1995, USEPA 1993 as cited by Rattner *et al*. 2001).

Ospreys are opportunistic and will hunt those species of fish most readily available at any certain time or location. As a result of this, the fish species preyed upon varies between osprey populations. Although the majority of osprey prey is live fish, they will often cruise weed beds looking for dead fish tangled in the littoral vegetation (Newton 1979).

ENERGETICS AND METABOLISM

Adult female ospreys have an estimated free living metabolic rate of 69 kcal/kg-day, and adult males have an estimated metabolic rate of 71 kcal/kg-day. A study of courtship feeding behavior completed at a Massachusetts osprey colony estimated daily food consumption at 940 g/pair/day or 1,175 kcal/pair/day, with males consuming on average 1.4 times more food mass than females (Poole 1985).

POPULATIONS AND DEMOGRAPHY

Survivorship: Estimated mortality among first-year birds is 57%. This rate decreases to 18% annually after the first year (Newton 1979).

Age at Maturity and Life Span: On average, ospreys reach maturity at 4.8 years of age (Newton 1979). Based on banding data, one osprey was 26 years and 2 months at time of recapture (Klimkiewicz 2000). This species has been known to live to 35 years of age, and the greatest number of recorded breeding seasons for a single bird is 23 (Canadian Wildlife Service 2000).

Mortality: The best-documented sources of mortality among osprey include nest collapses killing nestlings, and collisions with power lines near nest sites (Newton 1979). Adverse weather (i.e., cold rains, high winds, etc.) can cause high mortality among nestlings and fledglings.

Enemies: Direct predation of adult ospreys is poorly documented. The eagle owl (*Bubo bubo*) is known to kill both adult and nestling ospreys in Europe. In North America, great horned owls (*Bubo virginianus*) are known to take over nest sites and have been documented to prey on young and adults (Government of Canada 1996). Bald eagles (*Haliaeetus leucocephalus*) compete directly with osprey for food resources and will often harass ospreys forcing them to drop fish. Ospreys will typically avoid nesting in close proximity to eagle territories (Newton 1979). Osprey nests are often robbed by raccoon (*Procyon lotor*), American crow (*Corvus brachyrhynchos*), and common raven (*Corvus corax*) (Bent 1961).

STATUS

General: The use of the pestic ide DDT resulted in a dramatic decline of osprey populations in the northeast. By 1970, fewer than 10 successful nests occurred in Massachusetts (Veit and Petersen 1993). In 1990, surveys documented 190 nesting pairs of osprey nesting in Massachusetts. Populations are currently increasing in Cape Cod and outer islands as a result of nest platform construction. Given the present trend, population increases are expected to continue in the northern portion of the breeding range. Current osprey populations in Massachusetts exceed pre-DDT numbers in several portions of the state (Veit and Petersen 1993).

In The Primary Study Area: Figure 2 shows the locations where ospreys were observed during the 1998 – 2000 field surveys. In general, ospreys were uncommon visitors to the study area, and no active nesting was observed. Most observations were during late summer and fall (i.e., the fall migration period), and many of the osprey were seen feeding on goldfish (*Carassius auratus*) taken from the river and backwaters.

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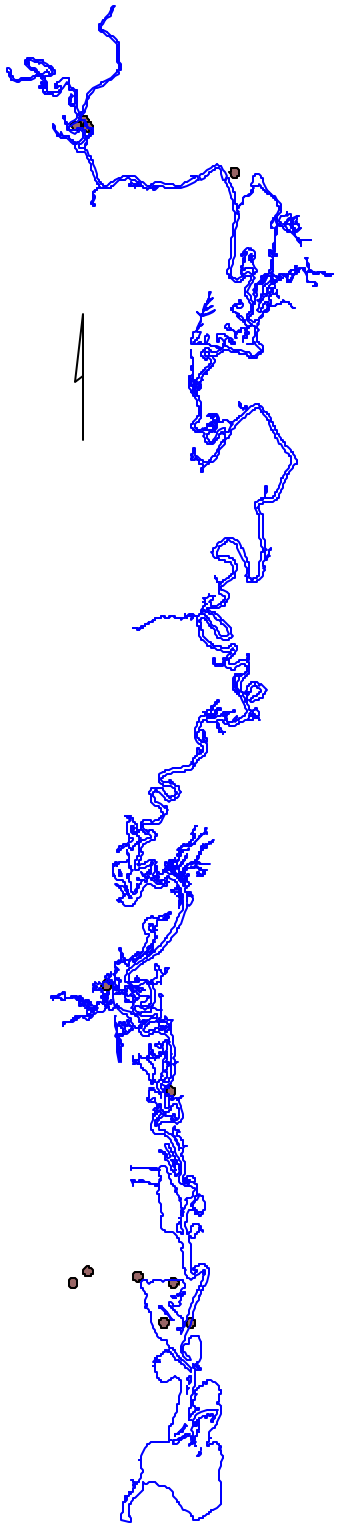

Figure 2. Osprey sightings in the primary study area

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